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NOTES ON THE FLORA OF SOUTHERN FLORIDA.

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Is the flora of Southern Florida and the Keys in reality North American or West Indian? One of the greatest authorities in botanical geography, Prof. Grisebach, in his latest work upon the distribution of plants ("Vegetation der Erde," 2, p. 340), as also in a previous one ("Die Geographische Verbreitung der Pflanzen West Indiens," pp. 19 and 20), favors the former opinion.

He says:—"The character of the vegetation of Florida is in general identical with that of Georgia and Carolina. But eight species of West Indian woody plants occur in Florida, and but six in Key West.* When the Northern Bahamas above 27° N. Latitude shall be explored it is probable that the difference between them and the neighboring main-land, but sixty-five English miles distant, will be yet more evident. This difference is not due to climate, nor yet to geological structure, for as the coast of Florida is surrounded by coral reefs, so has the archipelago of the Bahamas been built up by the same means. Why is it then that the vegetation of the West Indies has possession of these islands and not of the equally near and similarly formed Keys of Florida? Even the few plants which are common to both occur also for the most

*In Florida, two *Coccolobæ*, *Pithecolobium Unguiscati*, *Guettardia elliptica*, *Psychobria lanceolata*, *Myrsine læta*, *Jacquinia armillaris* and *Tournefortia gnaphalodes*; in Key West, *Guaiacum sanctum*, *Schœfferia frutescens*, *Passiflora angustifolia*, *Exostemma Caribæum*, *Erithalis fruticosa* and *Beurreria tomentosa*.

part on the continental coast of the Gulf, and may as probably have reached the Keys from there as from Cuba. The most obvious reason is found in the fact that the Bahamas are united with the Greater Antilles by innumerable islands and shoals, while on the contrary Florida and the Keys are separated from them by the Gulf Stream—a proof that ocean currents do not always serve to connect floral regions but at times aid in preserving the limits between creations originally distinct." Now to these suggestions some objections may be made. When we see the habitat of many hundred of species indicated in the books by the phrases "New England to Florida," "S. Carolina to Florida," etc., it seems evident that the flora of Florida belongs to that of North America. But "Florida" in most of these cases means Northern Florida. Southern Florida, from Tampa Bay southward, has been explored only at solitary points upon the coast by a few botanists, who have taken notice only of the more conspicuous and chiefly woody plants. It is not improbable that when the vegetation of this region is better known it will prove to be not so different from that of the Northern Bahamas as Prof. Grisebach now supposes.

Geological causes cannot be excluded in botanico-geographical investigations where recent causes are insufficient to explain facts. The coral formation of Southern Florida—if it be true that the polyps cannot live but in a certain depth of water—indicates a slow subsidence of the land, and this movement may possibly have preceded the upraising of the tertiary Atlantic and Gulf coast of the Southern States and the existence of the Gulf Stream. Between Bemini Point and Cape Florida the depth of the stream is considerably less than at any other point, and this may have been the line of connection between Florida and a tropical territory eastward, of which the Bahamas are the remnants. It is no more probable that the "few" woody plants enumerated by Grisebach have immigrated across the channel or made the long circuit of the shores of the Gulf, than that they are the residue of a once larger number of plants common to Florida and the Bahamas.

But is the number of these plants indeed so small? Dr. Chapman enumerates in his "Flora of the Southern States" no less than 231 species which do not extend northward of Tampa Bay. To these 16 may be added from other sources,* making 247 species

*From DeCandolle's Prodromus, *Hyptis spicata*, *Croton humilis* and *linearis*, *Argyrothamnia Fendleri*, and *Zamia Floridana* and *pumila*; from Bot. Mex. Bound. Survey,

(136 woody, 83 perennial, and 28 monocarpic), of which 187 are common to the West Indian Islands and partly to South America and (31) to Mexico, 23 to Mexico only, and 37 known as yet only from Southern Florida.

If it be conceded that the Gulf Stream is an insurmountable obstacle to immediate immigration from the West Indies, and that any plant from there must have made the circuit of the Gulf, why is it that the majority of these emigrants have not settled in Mexico, as should have been expected from the greater chances that evidently exist in favor of that country. The inference is reasonable that the 156 species of Southern Florida which are common only to regions lying southward and not to Mexico have for the most part not been transmitted by the waters of the Gulf, and that we must recur to other than the recent means of migration.

The flora of Northern Florida, including 58 widely distributed species which are not expressly noted by Chapman as growing there, comprises 1511 species of vascular plants, of which 875 occur in the Northern States. Of the remainder 234 extend to North Carolina, 113 to South Carolina, 108 to Georgia, 3 to Tennessee, and 53 only westward. Of all these only 15 are mentioned expressly as occurring in Southern Florida. Of the 125 which are known only from Florida 9 have been found in the southern part of the State. There are 1487 Floridan species which are not known as belonging to Southern Florida, or which at least are not so reported in published documents.

It may further be remarked that the above 247 southern species belong to 170 genera, of which 102 with 131 species are not represented in Northern Florida, and of these again 26 genera with 30 species belong to orders which are not found in other parts of the eastern United States. Comparing, moreover, the woody, perennial and monocarpic species, we find the numbers quite disproportionate and must suspect that a great number of perennials, particularly Cyperaceæ and grasses in the interior are unknown.

From all these facts we conclude that the flora of Southern Florida is, so far as known, not to be considered a part of the

Heliotropium polystachyum and *Sarcostemma clausum*; from Nuttall's Sylva, *Acacia latisiliqua*, *Sideroxylon fœtidissimum*, *Cordia speciosa* and *floribunda*, and *Coccoloba parvifolia*; and from Grisebach, *Abutilon permolle*, *Desmodium tortuosum* and *Crinum Floridanum (?)*.

North American flora, but a link between it and that of the West Indies, and that a portion of those species which are peculiar to the northern portions of the State, and the immediately adjacent region, may have been derived from the south.

THE CLASSIFICATION OF THE RHYNCHOPHOROUS COLEOPTERA.

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OTIORHYNCHIDÆ.

In a large number of genera* of Rhynchophora, at the front part of the mandibles, may be seen a round or oval depression, having the appearance of a scar, and which served, during the pupa stage, and for the early part of the imago life, as an attachment for a deciduous piece, of a conical and usually slender form. Many times specimens had occurred in which one or both of these pieces were still adherent, and the explanations thereof were varied and incorrect.† The opinion of Lacordaire seems to be quite satisfactory, that they are probably of service in enabling the insect to cut its way out from the nest or cell in which the transformation takes place.

While recognizing the frequent occurrence of this singular structure, altogether without parallel among other insects, it does not seem to have occurred to Lacordaire, that we have here a character of great importance for systematic purpose, and that after removing the large mass of such genera, the normal series of Curculionidæ would be much more amenable to classification. In fact I think it may be shown that the confusion and indefiniteness of the first part of the classification of Lacordaire is mainly owing to the intercalation of genera with scarred mandibles and those with simple mandibles. I have therefore placed the former as a separate family, having the following general characters.

The body affects two forms; in the apterous species the elytra are connate and convex with the humeri rounded; in the winged species they are more oblong, with the humeri more or less prom-

* Lacordaire, Gen. Col. vi, 5 (note).

† Müller, Germar's Mag. iii, 424.